SECTION 011100

SUMMARY OF WORK & GENERAL REQUIREMENTS

PART 1 – GENERAL

101. NAME OF PROJECT

Gerald Gentleman Station (GGS) Units 1 & 2 Multi-Pollutant Control Project

102. LOCATION OF PROJECT

Gerald Gentleman Station
6089 South Highway 25
Sutherland, NE 69165-0068

103. DESCRIPTION OF PROJECT

a. The Gerald Gentleman Units 1 & 2 have a nominal rating of 705 MW and 745 MW, respectively. Unit 1 incorporates a Foster-Wheeler opposed wall-fired boiler firing Power River Basin (PRB) fuels and Unit 2 incorporates a Babcock & Wilcox opposed wall-fired boiler firing PRB fuels. Unit 1 currently is equipped with low NOX burners (LNBs). Particulates are controlled using three reverse-gas baghouses for each unit. Unit 1 and 2 are equipped with hot-side ESPs that will be out of the flue gas path and demolished prior to the installation of the SCR system.

b. The purpose of the Project is to reduce plant emissions by adding pollution control equipment. A wet FGD system will be added to each unit to reduce SO2 emissions. Low NOx Burners will be added to Unit 2 to reduce NOx emissions, and SCRs will be added to both Units.

c. Each Unit's FGD system shall be the limestone slurry, forced oxidation type using a single absorber tower. Reagent preparation and FGD waste dewatering facilities shall be common to both units. Makeup water will be provided by expanding the station's existing well supplied water system.

104. SCOPE OF WORK

The CONTRACTOR shall design, manufacture, fabricate, furnish, erect, install, inspect, and startup, the FGD systems for Unit 1 & 2 with all the associated sub-systems, and accessories. All supplied equipment shall be utility grade, heavy duty, suitable for the application.

104.1 The CONTRACTOR's Structural and Architectural scope includes, but is not limited to, design, supply and installation of the following:

a. One (1) common reagent preparation building, one (1) common gypsum dewatering building and two (2) absorber buildings including all architectural features, above grade concrete floor slabs, metal wall systems and roof systems. All process equipment shall be located inside of the buildings. Each FGD building and the reagent preparation building shall be equipped with a mono-gender sanitary facility, consisting of a toilet, urinal, wash sink, mirror, and drinking fountain.

b. CONTRACTOR shall include supply and installation of sanitary facilities in Unit 1 absorber building and in the dewatering building.

c. Support steel for buildings, absorber outlet ductwork and above grade equipment. Reagent preparation building structural steel shall be configured and designed to support the limestone conveyor and limestone handling equipment supplied by others.

d. Two (2) absorber building rack and pinion elevators, one for each absorber building.

e. Galleries, access platforms and walkways for access to all CONTRACTOR supplied equipment including, but not limited to, valves, instruments, access man doors, hand holes, ports and view ports. Galleries and access platforms include, but are not limited to, structural support steel, stairs, ladders, ladder cages, grating, handrails, guard plates, swing gates.

f. Auxiliary steel for support of CONTRACTOR's pipe and pipe supports located on DISTRICT's utility racks.

g. Coating work consisting of surface preparation, shop coating, field touch-up and field coating for structural steel, equipment, tanks, piping and facilities supplied and installed by CONTRACTOR.

h. Grout work for building columns/posts, equipment and pipe supports.

104.2 The CONTRACTOR's Process and Mechanical scope includes, but is not be limited to, the following:

a. One (1) FGD absorber tower per unit plus component sparing including inlet duct and flue gas emergency quench section; outlet transition elbow; absorber recycle pumps, slurry spray headers and nozzles; mist eliminator; integral recycle tank with agitators; oxidation air compressors and oxidation air lances; absorber bleed system; and mist eliminator wash system.

b. Absorber outlet transition ductwork.

c. Absorber outlet duct expansion joint, and expansion joint between absorber outlet transition duct and chimney breeching, including expansion joint flanges and condensate drain.

d. Reagent preparation system including limestone storage silos, dust collection system, gravimetric feeders, ball mills and cooling system, classifiers, ball charging system, mill product and limestone slurry tanks, and limestone slurry pumps.

e. FGD waste gypsum dewatering system including hydroclones; vacuum belt filters, underflow, reclaim water system, and feed tanks; and pumps.

f. Flush water delivery and drain system for evacuating solids from piping, pumps, and valves.

g. Absorber outlet duct and chimney drain piping to the absorber recirculation tank.

h. Reagent preparation building, gypsum dewatering building and absorber building roof drainage piping to the building foundation.

i. Miscellaneous process tanks (including agitators) and pumps where required.

j. (2) 100 % air compressors, air receiver tanks, and air dryers per unit. The Unit 1 and Unit 2 facilities shall be cross-tied.

k. Sump pumps.

l. Ventilation and heating of buildings, rooms, and enclosures.

m. All interconnecting process piping, fittings, valves, and specialties including, but not limited to expansion joints, strainers, filters, pipe supports and hangers, air and water hose connections, service and fire water hose reels, safety shower and eyewash stations.

n. Piping insulation.

o. A computational fluid dynamic (CFD) and 1/12th scale flow models.

p. CONTRACTOR shall supply and install a service water system that is fed via the makeup water supply to each FGD system.

104.3 The CONTRACTOR's Electrical and I&C scope includes, but is not limited to, the following.

a. All necessary instrumentation and local control components, including but not limited to control drives, control valves, process transmitters, switches, sensors, instrument sensing lines, manifolds, sample lines, instrument racks and panels that are required for system operation.

b. Control logic design, distributed control system (DCS) input/output (I/O) definitions and recommended human-machine interface (HMI) graphics.

104.4 The CONTRACTOR's Erection and startup services include, but are not limited to, the following:

a. All building and construction permits required to perform Work.

b. All temporary office and storage facilities, supplies and telecommunication equipment, lavatories, and showers for CONTRACTOR's employees and sub-CONTRACTORs.

c. All supervision, labor, tools, and equipment required for receiving, unloading, handling, appropriate storage, fabricating and erecting materials, equipment, and accessories including scaffolding, compressors, welding machinery, fire protection equipment, testing equipment and any other items necessary to perform Work.

d. Consumable materials to perform Work, including, but not limited to, cleaners, lubricants, rags, and welding materials.

e. Connection to and distribution of DISTRICT provided utilities at designated terminal connections for temporary construction electric power, service water, and potable water.

f. Interface preparation (weld end preparation) and hardware (bolts, gaskets, flanges) to make initial and final connection to the DISTRICT's interface points. This includes providing additional flange gaskets required for testing, flushing, etc., of CONTRACTOR's piping system.

g. Insulation and lead paint abatement required to perform the Work

h. All quality inspections and code compliance inspections to be performed and/or coordinated by CONTRACTOR. The CONTRACTOR shall retain an independent testing laboratory, approved by the DISTRICT, for all testing services. The testing laboratory shall submit its testing program to the DISTRICT for review and approval prior to the commencement of the required testing services. Testing service performed by the independent testing laboratory shall not relieve any liability of the Work by the CONTRACTOR. The CONTRACTOR shall provide assistance to the independent testing laboratory and set up necessary access, scaffolding, safety protection, etc. to facilitate the

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execution of the field testing service. The CONTRACTOR shall not utilize the independent testing laboratory to perform any field testing service.

i. Certification of welders and welding operators.

j. Technical assistance in support of the DISTRICT's implementation of the CONTRACTOR's control logic into the DISTRICT's DCS. This assistance shall include regular attendance at meetings with the DCS integrator, prompt responses to questions from DISTRICT, and any other technical support required to implement CONTRACTOR's control logic. This assistance shall also include witness of testing of the control logic.

k. Lubricant first fills for all CONTRACTOR furnished equipment.

l. Spare parts required for testing and check-out of equipment

m. Furnish all necessary personnel as required to support the DISTRICT's performance guarantee testing contractor. CONTRACTOR shall furnish a qualified on-site representative to represent CONTRACTOR during the availability test period.

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105. MATERIALS AND SERVICES BY OTHERS

105.1 The DISTRICT (through separate contracts) will furnish:

a. Construction electric power supply terminal location for CONTRACTOR's power distribution system.

b. Foundations, including trenches, sumps, and containment curbs.

c. Trench and sump covers, support steel for sump pumps and agitators, grating over sumps.

d. Utility rack support steel for CONTRACTOR's piping.

e. Electrical conduit and cable tray routed between CONTRACTOR's building terminal locations.

f. Limestone unloading, stack-out and reclaim system.

g. Gypsum stack-out and reclaim system.

h. Waste water treatment system, if required.

i. Makeup water supply, potable water supply, instrument and service air, and service water.

j. Wet chimney.

k. Fire water system supply piping to terminal locations..

l. Medium voltage switchgear and 480 volt switchgear including breakers; motor control centers including starters.

m. External cables for power, control and alarm wiring, including terminations.

n. DCS equipment, and logic and graphic configurations based on CONTRACTOR's design inputs, i.e. control functional descriptions, control logic diagrams, I/O and alarm set point lists, etc.

o. Lubricants and consumables required during performance and availability testing operation.

p. Performance and availability guarantee testing.

q. Building and equipment anchor bolts.

r. Booster fans and upstream ductwork.

106. TERMINAL AND INTERFACE POINTS

106.1 The terminal points listed in Table 1-1 are provided to define interface locations and connection parameters with equipment supplied by others. Lack of reference to a specific terminal point does not relieve CONTRACTOR from providing the required interface for all such terminal points. CONTRACTOR shall provide interfacing design information at each terminal point.

TABLE 1-1
TERMINAL POINTS

Item/Description	INTERFACE POINT	COMMENTS
Limestone Supply to Day Silos	Flange at the top opening of the limestone day silos.	1. Contractor shall provide design and supply of structural support of discharge end of limestone conveyor, discharge chutes, or reversing distribution conveyor (as applicable) at the top of the day silos. Material handling supplier shall provide applicable detailed design information and anticipated loads to Contractor for design. 2. All conveyors and limestone distribution equipment above the flange at the top opening of the limestone day silos shall be the responsibility of the material handling supplier.
Gypsum Product Transport from Dewatering Building	Gypsum product discharge from belt filters.	1. After the gypsum product drops off the belt filter via gravity, it is the responsibility of others to route, collect and remove the product from the dewatering building.

Item/Description	INTERFACE POINT	COMMENTS
Flue gas inlet duct at absorber.	Inlet expansion joint.	1. DISTRICT will provide expansion joint mounting flange. 2. CONTRACTOR shall provide thermal and non-thermal movements for design of expansion joint, to be provided by others. 3. CONTRACTOR to provide design and as-built location and configuration of absorber inlet duct. 4. CONTRACTOR to design absorber inlet duct for loads from DISTRICT's expansion joint.
Outlet transition duct from Absorber	Flange at chimney breeching expansion joint.	1. Extent of CONTRACTOR's absorber outlet transition duct is indicted on the chimney conceptual drawings. 2. Chimney contractor will provide downstream FRP expansion joint mounting flange. Contractor shall provide mounting flange details. 3. CONTRACTOR shall design and install expansion joint at chimney breeching. 4. Chimney contractor will provide thermal and non-thermal movements for design of expansion joint by CONTRACTOR. 5.
Chimney Condensate Drain	Condensate pipe outside chimney wall.	1. Extent of CONTRACTOR's condensate piping at chimney is indicated on chimney conceptual design drawings. 2. Chimney contractor will provide thermal and non-thermal movements at interface point for design of CONTRACTOR's condensate piping and associated supports. 3. Chimney contractor will provide design of condensate drain piping interface point.

Item/Description	INTERFACE POINT	COMMENTS
Utility piping: absorber makeup water Supply, potable water, instrument air, service air, fire protection water.	Pipe flanges located 1'-6" outside exterior of absorber building, reagent preparation building, and dewatering building siding..	4. Utility service piping to a pipe flange exterior to the absorber building, reagent preparation building, and dewatering building shall be provided by others. 5. Contractor shall be responsible for building penetration and sealing, piping stub out and for all piping systems inside of buildings.
Support of interconnecting process piping between FGD systems and reagent preparation and dewatering buildings, and piping to external tanks.	DISTRICT'S pipe rack support steel will be located at approximately 15' spacing.	1. CONTRACTOR shall design, supply, and install all pipe support supplemental steel. 2. CONTRACTOR shall provide dimensioned plan and elevation sketches indicating the configuration of all service platforms required for access to pipe, valves, etc, that will be supported by the DISTRICT'S pipe racks. The CONTRACTOR shall locate the access platforms in the model. The DISTRICT will design, supply, and install the platforms.
DCS and Control Wiring	Instrument and control panel connections.	Contractor shall provide control functional descriptions, control logic, alarm and I/O definitions. All other DCS work shall be by others.
Sanitary sewer	Pipe flange located external or external to buildings.	Contractor shall be responsible for building penetration, piping stub out and for all piping systems inside of buildings.
Roof drains Composite metal roof EPDM roof	 Downspout outlet at grade Roof drain piping at approx 1'- 6" above building foundation	
Electric power	Motor and equipment terminal connections.	Wiring to motors and equipment will be provided by others.

107. DESIGN AND REFERENCE DRAWINGS

Drawings provided with this specification are listed in DISTRICT's Contract Drawings and Data Requirements.

108. PACKAGING AND SHIPPING

Packaging and shipping of equipment and materials shall be in accordance with DISTRICT's General Conditions.

109. TECHNICAL FIELD ASSISTANCE

109.1 CONTRACTOR shall provide the services of on site competent technical personnel to advise, assist and guide in the unloading, storage, erection, installation, testing and startup of the equipment in accordance with the DISTRICT'S General Requirements.

109.2 CONTRACTOR shall arrange for its sub-suppliers' representatives to provide competent field services, as necessary, to ensure all of the requirements of this specification are met.

109.3 CONTRACTOR shall furnish necessary office equipment required by CONTRACTOR'S field personnel at the Project site.

109.4 The CONTRACTOR'S technical personnel shall cooperate (What does this mean?) with the DISTRICT'S erection CONTRACTORs. CONTRACTOR'S technical field personnel shall be vested with authority to make decisions binding on CONTRACTOR.

109.5 CONTRACTOR shall provide necessary competent technical services as required to resolve preliminary operating problems as they develop until satisfactory operation is achieved for how long?????. Field technical services for manufacturing errors shall be paid for by CONTRACTOR.

110. CONFLICT See Page D-1 (for items 110. – 110.3

110.1 In the event of variation between Contract Terms and Conditions and the requirements of this Specification G-5301, Contract documents shall govern.

110.2 In the event of variation between the Engineer's Standards and the Project Specification or the drawings, the Project Specification and the drawings shall govern. In the event of variations between the Project Specification and the drawings, the drawings shall govern.

110.3 The CONTRACTOR shall be solely responsible for advising Purchaser in writing of any conflicts between the Project Specification and the drawings and the CONTRACTOR's methods, including performance and levels of quality. The CONTRACTOR agrees that its obligations, liabilities and warranties shall not be diminished or extinguished due to its meeting the requirements of the Project Specification and the drawings.

111. HAZARDOUS MATERIALS [MAY INTEGRATE INTO CONTRACT SECTION F]

111.1 As required under Federal Hazardous Communications Standards and applicable state and local laws, the CONTRACTOR shall provide Material Safety Data Sheets covering all hazardous materials furnished under or otherwise associated with the work under this Contract in accordance with DISTRICT's General Requirements, or the CONTRACTOR shall certify in writing that no Material Safety Data Sheets are required under any federal, state, or local law, regulation, statute or ordinance in effect at the jobsite. CONTRACTOR shall identify those hazardous materials that remain on the jobsite at the end of the Project.

END OF SECTION 011100